



## **Simultaneous multiple-calf allonursing by a wild Masai giraffe**

Bond, Monica L ; Lee, Derek E

**Abstract:** 1 **INTRODUCTION** Allonursing is when mothers nurse young that are not their own. It is rarely seen in wild giraffes (*Giraffa camelopardalis*). Pratt and Anderson (1979) reported that of 860 observations of nursing attempts, 37 were by an unrelated calf, and just one succeeded in sustained nursing. Saito and Idani (2018) documented only five of 76 allonursing attempts resulted in sustained nursing. Typically, the mother appeared unaware that the nursing calf was not her own, and thus, these studies concluded that the instigators of allonursing were unrelated calves stealing milk from unwitting mothers. Here, we report an instance of simultaneous allonursing by three giraffe calves in Tarangire National Park, Tanzania. This case is unusual in that the lactating female appeared to be aware of all three nursing calves and allowed nursing for an extended period of time (>1 min). 2 **METHODS** Since 2011, we systematically collected data on giraffes during 6 road-transect surveys per year in a 1,500-km<sup>2</sup> area of the Tarangire Ecosystem, northern Tanzania, between latitude 3.27–4.08°S and longitude 35.73–36.23°E. The main vegetation communities are *Acacia tortilis* parkland, *Acacia-Commiphora* woodland, gall *Acacia drepanolobium* woodland, *Combretum-Dalbergia* woodland and open grassland (Lamprey, 1963). We identified individual giraffes from photographs using their unique and unchanging coat patterns (Foster, 1966) with the aid of pattern recognition software (Bolger, Morrison, Vance, Lee, Farid, 2012). We did not genetically assign calves to mothers, but we assumed mother–calf pairs from extended suckling behaviour (>5 s) without rejection. 3 **RESULTS AND DISCUSSION** We documented 82 extended nursing bouts during 45 surveys from 2011 to 2019. All previous bouts were a single female and single calf. On 27 January 2019, we witnessed a remarkable case of simultaneous multiple-calf allonursing. An adult female moved towards a group of calves (<1 year of age), and three of the calves immediately ran over and began suckling from her. We were not certain whether any of the calves were her offspring nor whether the calves were related to each other or to the female. The calves were slightly different sizes, and thus, we presumed different ages, and two were females, and one was a male (Figure 1). The adult female allowed this nursing for over a minute and did not actively reject the nursing calves. She appeared to be aware of the situation as all three calves approached her from the front and were in her view during nursing (Figure 1).

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1 Note and Record

2 **Simultaneous multiple-calf allonursing by a wild Masai giraffe**

3 **RH: Multi-calf allonursing in giraffes**

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9 **Key words:** allonursing, giraffe, *Giraffa camelopardalis*

10 **Introduction**

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18 Here we report an instance of simultaneous allonursing by three giraffe calves in Tarangire  
19 National Park, Tanzania. This case is unusual in that the lactating female appeared to be aware of  
20 all three nursing calves and allowed nursing for an extended period of time (> 1 min).

## Methods

Since 2011, we systematically collected data on giraffes during 6 road-transect surveys per year in a 1,500-km<sup>2</sup> area of the Tarangire Ecosystem, northern Tanzania, between latitude 3.27 °S to 4.08°S and longitude 35.73 °E to 36.23°E. The main vegetation communities are *Acacia tortilis* parkland, *Acacia-Commiphora* woodland, gall *Acacia drepanolobium* woodland, *Combretum-Dalbergia* woodland, and open grassland (Lamprey, 1963). We identified individual giraffes from photographs using their unique and unchanging coat patterns (Foster, 1966) with the aid of pattern-recognition software (Bolger et al., 2012). We did not genetically assign calves to mothers, but we assumed mother-calf pairs from extended suckling behavior (>5 s) without rejection.

## Results and discussion

We documented 82 extended nursing bouts during 45 surveys from 2011–2019. All previous bouts were a single female and single calf. On 27 January 2019, we witnessed a remarkable case of simultaneous multiple-calf allonursing. An adult female moved towards a group of calves (< 1 year of age), and three of the calves immediately ran over and began suckling from her. We were not certain whether any of the calves were her offspring, nor whether the calves were related to each other or to the female. The calves were slightly different sizes, thus we presumed different ages, and two were females and one was a male (Fig. 1). The adult female allowed this nursing for over a minute and did not actively reject the nursing calves. She appeared to be aware of the situation as all three calves approached her from the front and were in her view during nursing (Fig. 1).

Allonursing in captive giraffes was reported, both in a published study (Gloneková et al., 2016) and in anecdotal reports provided to us. In contrast, sustained allonursing was uncommon in wild giraffes (Langmann, 1977; Pratt & Anderson, 1979; Gloneková et al., 2017; Saito & Idani, 2018). In wild giraffes, non-filial calves who initiated allonursing attempts joined only after the filial calf began to suckle, and were never successful when approaching a female by themselves (Saito & Idani, 2018). Such allonursings appeared to be milk theft. This was the first instance where we documented more than one calf allowed to suckle, and is consistent with the rarity of allonursing from previous studies. To our knowledge this is the first record of three calves nursing simultaneously from a single wild adult giraffe, and we believe the female was aware of all three calves. Given that the calves rushed to her, we suspect she has nursed these calves previously.

Giraffes typically give birth to a single calf (Dagg, 1971); twins are extremely rare and although one usually dies it is possible that two of the allonursing calves were filials. We therefore entertain three calf scenarios: (1) all non-filial calves; (2) one filial and two non-filials; and (3) 2 filials and one non-filial. From these scenarios we propose 6 potential explanations for the female's allonursing behaviour. The adult female may be evacuating milk from her udder (1) that her own calf did not drink or (2) she may have lost her calf and still has milk that she is sharing with calves in her herd (Roulin, 2002). (3) The two smaller calves may be twins and the larger third calf is stealing milk, as it is standing in the position typical for milk theft, further from the female's view (Saito & Idani, 2018). She may be allowing related or unrelated calves to allonurse: (4) to improve survival of calves related to her (Hamilton, 1964) or (5) for reciprocity (Trivers, 1971). (6) Allonursing can further be non-adaptive, as a by-product of providing care in a group-living context (Jamieson, 1989; Packer et al., 1992; Packer & Pusey, 1994).

Total reproductive investment in filial offspring for monotocous species like giraffes is high (MacLeod & Lukas, 2014), and lactation is more energetically costly than other types of parental care (König, 1997). Giraffe calves grow quickly to escape predation (Foster & Dagg, 1971). Allonursing is therefore costly if the female's own calf is deprived of milk it needs for rapid growth (Roulin, 2002), which may explain why this behavior is so rare in the wild. However, giraffe calves form crèches accompanied by one or a few older females (Dagg & Foster, 1976), indicating some level of cooperative care in this species, thus females may occasionally allow allonursing if benefits outweigh costs. Female giraffes tend to associate with related females (Bercovitch & Berry, 2012; Carter et al., 2013), so allonursing may impart inclusive fitness benefits if the non-filial calves share her genes (Hamilton, 1964). Benefits may also include reciprocity, whether or not the allosucklers are related to her, if her behavior is reciprocated towards her current (or future) calf by other females at some later date (Trivers, 1971, but see Gloneková et al., 2016 which found no evidence of quantitative reciprocity in a captive giraffe population with high allonursing rates). Ungulates can discriminate kin (Cassinello & Calabuig, 2008), and given that they benefit from living in social groups with their calves reared in crèches, allonursing might be a rare but inevitable consequence of group rearing. The costs of always rejecting non-filial calves might be higher than the costs of allowing some milk theft.

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136 **Figure captions**

137 Fig. 1. Three calves simultaneously nursing from an adult female Masai giraffe (*Giraffa*  
138 *camelopardalis tippelskirchi*) in Tarangire National Park, Tanzania on 27 January 2019.

139 Photo credit: Monica L. Bond.

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141 Figure 1



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